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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/928,893	09/12/1997	HEIKKI HEIKKILA	85940/15	1188

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KENYON & KENYON
ONE BROADWAY
NEW YORK, NY 10004

EXAMINER

NAFF, DAVID M

ART UNIT	PAPER NUMBER
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1651

49

DATE MAILED: 08/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

08/928893

Applicant(s)

Hettila et al

Examiner

1/28

Group Art Unit

1651

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- ☒ Responsive to communication(s) filed on 6/10/03
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1, 3, 5-9, 11-13, 15, 16, 19-21 + 23-34 is/are pending in the application.
- Of the above claim(s) 32-34 is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 1, 3, 5-9, 11-13, 15, 16, 19-21 + 23-31 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement.

Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
 - ☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been received.
 - ☐ received in Application No. (Series Code/Serial Number) _____
 - ☐ received in this national stage application from the International Bureau (PCT Rule 1.7.2(a)).
- *Certified copies not received: _____

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☐ Interview Summary, PTO-413
- ☐ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other _____

Office Action Summary

The request filed on 6/10/03 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 08/928,893 is acceptable and a CPA has been established. An action on the CPA follows.

5 The amendment of 6/10/03 amended the specification, and claims 1, 8, 13, 19, 23, 26, 28, and 31. Claims 2, 4, 10, 14, 17, 18, and 22 have been previously canceled.

Claims 32-34 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the
10 restriction (election) requirement in Paper No. 40 (filed 4/15/02).

Claims examined on the merits are 1, 3, 5-9, 11-13, 15, 16, 19-21 and 23-31.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

15 ***Specification***

The disclosure is objected to because of the following informalities: in the insertion by amendment of 6/10/03 to page 1 of the specification, "is a continued prosecution application (CPA) of U.S. Patent Application Serial No 09/928,893 filed September 12, 1997, which"
20 should be deleted since filing a CPA does not make an application another different application. Filing a CPA involves the same application with the same serial number.

Appropriate correction is required.

Claims 1, 3, 5-9, 11-13, 15, 16, 19-21 and 23-31 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Adequate support is not found in the specification for converting "over about 50% of the xylose" in the starting material to xylitol as required in claims 1, 23 and 31. The claimed limitation is not found in the specification.

Adequate support is not found in the specification for a lignocellulose-containing material comprising xylose when the lignocellulose-containing material is not hydrolyzed as in the preamble of claim 31.

The specification further fails to disclose or support a process having steps as in claim 31 of fermenting a portion of a prehydrolysate to convert xylose to xylitol, then hydrolyzing another portion of the prehydrolysate to produce a hydrolysis product comprising xylose and hexose, and fermenting the hydrolysis product to convert hexose to ethanol, and during fermentation converting xylose in the hydrolysis product to xylitol.

Claim Rejections - 35 USC § 112

Claims 1, 3, 5-9, 11-13, 15, 16, 19-21 and 23-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 3 of claim 1, "the" should be deleted since there is not antecedent basis for hydrolyzed material containing xylose and hexose. The comma at the end of line 3 should be deleted since it is not needed and leads to confusion as to the what comprises the xylose and hexose.

5 In line 8 of the claim "hexose" should be changed to -- glucose -- since converting glucose to ethanol is required bridging lines 10 and 11.

In line 2 of claim 3, "said" should be deleted, and -- hydrolyzed -- should be inserted after "material" since there is not antecedent basis for lignocellulose-containing material that is not hydrolyzed.

10 In line 2 of claim 6 "the" should be deleted since there is not antecedent basis for "yeast cells". A "yeast strain" is required in claim 1.

In line 2 of claim 8, "a" and "species" should be deleted since "*Candida tropicalis*" is inherently a species.

15 In line 2 of claim 9, "of the species" should be deleted since "*Debaryomyces hansenii*" is inherently a species.

In line 2 of claim 11, "hydrolyzed" should be changed to -- produced by --, and in line 3, -- of lignocellulose-containing material -- should be inserted after "hydrolysis" since the claim is unclear as to the
20 material being hydrolyzed by steam explosion and enzymatic hydrolysis. The claim reads as if hydrolyzed lignocellulose-containing material is being further hydrolyzed.

In line 2 of claim 19, before "hydrolysis" there should be inserted -- the hydrolyzed lignocellulose-containing material is produced by a --,
25 and cancel "is carried out by the" to be clear as to the material in

claim 1 being produced by hydrolysis. Additionally, in line 3, "or" should be replaced with -- and -- for a proper Markush group, and "combinations" should be changed to -- a combination -- since only one combination can result from a Markush group of only two members.

- 5 In line 2 of claim 23, "the" should be deleted since there is not clear antecedent basis for lignocellulose-containing material that is not hydrolyzed. In line 3, -- hydrolyzed -- should be inserted after "material" to be clear that the material is that hydrolyzed. In line 8, "the" should be deleted for the same reason as in line 3 of claim 1.
- 10 Bridging lines 14 and 15, "free hexose" should be replaced with -- glucose -- since glucose is reduced or converted to ethanol (bridging lines 17 and 18 and lines 20 and 21).

In line 2 of claim 24, -- to produce the hydrolyzed lignocellulose-containing material -- should be inserted after "hydrolysis" to be clear
15 as to where in claim 23 hydrolysis is carried out.

In line 2 of claim 25, "fermented" should be inserted before "solution" to be clear as to the solution in claim 23 from which solids are removed.

In line 2 of claim 26, "genera" should be deleted since the yeast
20 name is the name of a yeast species rather than the name of a yeast genus.

In line 3 of claim 30, "solution" should be replaced with -- starting material -- to be consistent with claim 23 which does not require a solution.

In line 2 of claim 31, -- hydrolyzed -- should be inserted before "lignocellulose" to be consistent with steps of the claim. In line 5, -- containing xylose -- should be inserted after "prehydrolysate" since line 7 requires converting xylose to xylitol by fermenting the prehydrolysate. In line 14 of the claim, "hexoses" should be replaced with -- glucose -- since bridging lines 16 and 17, glucose is converted to ethanol.

Claim Rejections - 35 USC § 103

Claims 1, 3, 5-9, 11-13, 15, 16, 19-21 and 23-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heikkila et al (5,081,026) in view of Chahal (5,047,332).

Heikkila et al disclose (paragraph bridging cols 2 and 3) fermenting a hydrolyzed lignocellulose-containing material to produce a hydrolyzate containing xylose and hexoses, fermenting the hydrolyzate with yeast to produce a fermented product containing xylitol, ethanol and yeast, removing yeast, removing ethanol by evaporation or distillation, chromatographically separating a xylitol-rich fraction and recovering xylitol from the xylitol-rich fraction by crystallizing the xylitol.

Chahal discloses (col 5, lines 20-29) producing ethanol for use as fuel from lignocellulose-containing biomass by fractionating lignocellulose into cellulose, lignin and hemicelluloses, hydrolyzing the cellulose with cellulase to produce glucose and fermenting the glucose with yeast to produce ethanol.

It would have been obvious to obtain ethanol in the process of Heikkila et al as suggested by Chahal by hydrolyzing cellulose of lignocellulose to glucose so that yeast can ferment the glucose to

ethanol. The xylose obtained by Heikkila et al results from hemicellulose (col 1, lines 55-61). It would have been apparent from Chahal that lignocellulose material contains cellulose in addition to hemicellulose, and the cellulose can be hydrolyzed with cellulase to glucose for fermenting to ethanol. Thus, it would have been expected that cellulose in addition to hemicellulose is present in the lignocellulose material used by Heikkila et al (col 3, lines 51-68) as a starting material, and it would have been obvious to hydrolyze the cellulose to glucose to provide production of ethanol for use as suggested by Chahal. Producing xylitol and ethanol in separate steps as in claim 31 would have been a matter of obvious choice depending on individual preference and convenience within the ordinary skill of the art. The glucose/xylose ratio range and percent of glucose and xylose conversion as claimed would have been inherent when carrying out the process of Heikkila et al as set forth above. Moreover, it would have been obvious to optimize conditions to maximize xylitol and ethanol production since these are desired products.

Response to Arguments

Applicant's arguments filed 6/10/03 have been fully considered but they are not persuasive.

Applicants urge that Heikkila et al cannot be used as prior art under 35 U.S.C. 103 via 35 U.S.C. 102(e) against the claims since the present application and Heikkila et al are commonly owned. However, it must be established that when the present invention was made, i.e. at the time of filing of the application in Finland, the invention was assigned

to the same person or organization as the Heikkila et al patent was assigned (see MPEP 706.02(I)(1) beginning on page 50). A mere statement of common ownership is not adequate. It should be noted that the application filed in Finland on 1/15/90 does not antedate Heikkila et al since Heikkila et al is a continuation of Serial No. 297,791, filed 1/17/89.

Double Patenting

Claims 1, 3, 5-9, 11-13, 15, 16, 19-21 and 23-31 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-28 of U.S. Patent No. 5,081,026 in view of Chahal for reasons set forth above in the 35 U. S. C. 103 rejection.

It would have been obvious to produce ethanol in the claimed process of the patent to obtain ethanol for use as suggested by Chahal by hydrolyzing cellulose in the starting material with cellulase to obtain glucose that can be fermented to ethanol.

Response to Arguments

Obvious double patenting is not based on 35 U.S.C. 103, but is based on a judicially created doctrine. Therefore, removing Heikkila et al from the rejection under 35 U.S.C. 103 via 35 U.S.C. 102(e) by establishing common ownership, does not also remove Heikkila et al from the obvious double patent rejection which has a basis different than when Heikkila et al is applied as prior art under 35 U.S.C. 103.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Naff whose telephone number is (703) 308-0520. The examiner can normally be reached on

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Monday-Thursday and every other Friday from about 8:30 AM to about 6:00 PM.

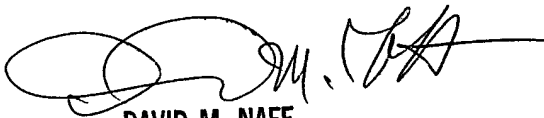
If attempts to reach the examiner by telephone are unsuccessful, a message can be left on voice mail.

5 If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn, can be reached at telephone number (703) 308-4743.

The fax phone number is (703) 872-9306 before final rejection or (703) 872-9307 after final rejection.

10 Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0196.

15 DMN
8/1/03


DAVID M. NAFF
PRIMARY EXAMINER
ART UNIT 12857